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TO: BRIAN T. PENDLETON **FAX NO:** (703) 305-9508

DATE: May 23, 2002

FROM: SHAWN W. O'DOWD

SUBJECT: Application No. 09/072,412; Filed 05/04/98

Docket No. 1538/15

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MESSAGE:

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PATENT
DOCKET NO.: 1538/15

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : Schwartz, S. *Official*

SERIAL NO. : 09/072,412

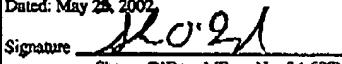
FILED : May 4, 1998

FOR : MICROPHONE-TAILORED EQUALIZING SYSTEM

GROUP ART UNIT : 2644

EXAMINER : B. Pendleton

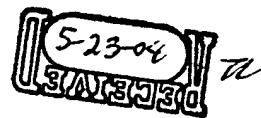
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Dated: May 23, 2002
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COMMUNICATON

SIR:

The following comments are a supplement to Examiner interview held on May 15, 2002 with Examiners Isen and Pendleton. Applicant wishes to thank the Examiners for their time and efforts at this interview.

Official

The following is claim 1 as currently amended:

1. A method for providing a system for high fidelity reproduction of the sound of a selected type of acoustic instrument, the method comprising:
 - (1) placing a first microphone at a selected location proximate to the acoustic musical instrument;
 - (2) separately playing the musical instrument to produce sounds as picked up by the first microphone;
 - (3) playing reference sounds of the instrument;
 - (4) comparing the sounds of the musical instrument as picked up by the first microphone with the reference sounds directly from the instrument; and
 - (5) designing a tailor-made equalizer for the first microphone to compensate for the differences between the sounds as picked up by the microphone and the reference sounds directly from the instrument.

Unexpected Results

Applicant believes he has shown that combining the placement of a "first microphone" at a selected location as in step 1 of claim 1 with the design of a tailor-made equalizer as described in step 5 of claim 1 may yield a very high quality result, comparable with the very best existing art, and this result requires no prior knowledge or experience of the user. It may be accomplished by a completely inexperienced individual, someone who could not do so with any currently available equipment.

This was demonstrated during the interview when Examiner Pendleton was able to match a reference guitar recording to a separate recording from a microphone placed at a selected location proximate to a guitar in about 3 minutes time using a microphone-tailored equalizer. The reference recording was made using a B&K/Danish Pro Audio 4036 microphone (about \$1200) and a John Hardy M1 microphone amplifier (about \$2000). The three minutes included instructions for operation (required only for first use or so), the actual adjusting of the three controls while comparing to the reference, and the final comparison when done. Applicant submits that an attempt to perform a similar process using the prior art equipment (e.g. the graphic and parametric equalizers presented at the interview), would take a much more significant block of time to perform, if at all possible.

Additionally, in implementing the process of step 5 of claim 1 unexpected and unusual results in the resulting equalizer may occur. For example unexpected/unusual filters (such as the multiple ganged band-reject group controlled by the "Mid" control of the guitar equalizer, as demonstrated at the interview); unexpected/unusual filter signal paths (such as those shown in Figures 3, 4, and 5); and unexpected/unusual filter shapes (such as that demonstrated at our meeting, where the width referred to as "Q" of an equalizer element automatically varied with the setting of the same element's frequency nadir) are designed that provide functional solutions, often superior to those available in the prior art, that do not (and previously have not) suggested themselves as useful solutions in the art (even as simply a way to use existing equipment). These unexpected/unusual filters, signal paths, and filter shapes do not suggest themselves until the comparing of step 4 is combined with the designing process of step 5 in claim 1.

Commercial Success

Though the present invention has not been introduced commercially, Applicant at least anticipates that tailored equalizers as recited in the pending claims combined with microphones for acoustic musical instruments will achieve commercial success over the use of a dedicated off-the-shelf equalizer (e.g., by permanently setting the knobs of such an equalizer). This is due, in part, to the prohibitive expense of the off-the-shelf equalizer to achieve the result recited in the pending claims (if it can be achieved at all).

Use of Controls on the Tailored-Equalizer

There may have been some confusion as to the use of knobs in the tailored-equalizers demonstrated at the interview. Such knobs are not necessary to practice the present invention. The devices shown at the interview had markings "N" (for "Normal setting"), which may allow someone to operate the equalizer of claim 1 with no adjustments at all, and it is not necessary to provide a tailor-made equalizer with any adjustments. For example, the devices demonstrated at the interview could be modified by replacing the adjustable potentiometers with fixed resistors. While a device with no adjustments is lower in cost, providing for some operator adjustment is a superior solution, for a variety of reasons. One case is when instruments change their sound, due to weather changes (for instruments made with wood), or when violin or guitar strings or drum skins are replaced. These changes are more noticeable when the microphone is placed very close to the instrument than when far from the instrument, so that a change of strings or skin would affect the sound at the proximate location of claim 1 step 1 more than the change of strings or

skin affects the sound at the reference position of claim 1 step 3. Allowing for adjustment accommodates for these changes. Also, each brand and model of acoustic instrument, and even different instances of the same brand and model, can sound quite different. Providing some 'un-skilled operator' controls allows for more accurate use with the entire variety of instrument makes and models, while allowing for a much cheaper manufacturing cost, by allowing for (e.g.) one model of the present invention to be used for any make and model of guitar, rather than manufacturing and distributing hundreds of different tailor-made equalizer models for the hundreds of different makes and models of guitars available.

Draft Claims for Discussion Purposes

In the interest of continuing the discussions of claim allowability at the recent interview. Applicant presents the following draft claims for discussion purposes.

28. A method for providing a system for high fidelity reproduction of the sound of a selected type of acoustic instrument, the method comprising:

- (1) placing a first microphone at a selected location proximate to the acoustic musical instrument;
- (2) playing the musical instrument to produce sounds as picked up by the first microphone;
- (3) determining reference sounds as produced by the playing of the instrument;
- (4) comparing the sounds of the musical instrument as picked up by the first

microphone with the reference sounds of the instrument; and

(5) designing a tailor-made equalizer for the first microphone to compensate for the differences between the sounds as picked up by said first microphone of step 1 at said selected location of step 1 and the said determined reference sounds of step 3.

29. The method of claim 28 wherein said tailor-made equalizer includes at least one of:

- at least one filter element with a limited frequency range, said range limited to exclude frequencies out of the range required for said filter element to accomplish said compensation,
- at least one filter element with a limited gain range, said range limited to exclude gain settings out of the range required for said filter element to accomplish said compensation,
- at least one filter element with a specified transfer function, said specified transfer function set to accommodate said filter element to accomplish said compensation.

30. The method of claim 29 wherein at least one of said filter elements is accomplished via digital circuits.

31 The method of claim 29 wherein at least one of said filter elements has at least one frequency, shape, or relative gain parameters fixed.

Respectfully submitted,
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Dated: May 23, 2002

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